sacral plexus, proofs of which may be obtained both by the effects of stimulation and of section. They run in the cord of the sympathetic, and having issued from this join the sciatic nerve. They pass from the sympathetic by fibres proceeding to the first four roots of the lumbar plexus, as well as to the roots of the three last dorsal nerves. It is only when all these nerves have been divided that the sweat secretion is arrested in the foot, whilst irritation of any of the fibres can induce it. The modes in which the sweat-centres can be excited are just those that are in ordinary operation. In some instances peripheral stimuli and differences in the quality of the blood exert a great influence. The secretion is induced by psychical conditions, as anxiety; and Luchsinger has observed it to be occasioned by a peripheral stimulus in a colleague, in whom the use of pepper causes the formation of large drops of sweat on the forehead and bridge of the nose. Amongst the changes in the quality of the blood observed by Luchsinger to exert a positive influence on the secretion are dyspnœa, exposure to a high temperature, and the toxic influence of alcohol. These produced an increased secretion, even when the cerebral hemispheres had been removed to abolish psychical impressions, or when the cord had been divided, or the four cerebral arteries had been ligatured.—*Practitioner*, May, 1877.

MATERIA MEDICA AND THERAPEUTICS.

On Chloral.

Dr. Liebreich, Professor of Therapeutics in the University of Berlin, in an article on chloral (*Practitioner*, June, 1877), says: Taking full account of the clinical facts, I believe that in the case of chloral it is in the highest degree essential that it should be freed from all chemical impurity whatever; and that the chemical impurities special to chloral hydrate, other than its highest state of crystalline purity, are, more than in other cases, of a kind to interfere with and to contravene the legitimate and desired effects of the drug. For this reason I would altogether prohibit the use of chloral, either in solution or otherwise, which is not of the utmost purity. I may add that there is no practical means by which the purity of chloral in solutions can be ascertained; and the best authorities state that a very large proportion of the solutions current in medical and pharmaceutical practice are of an impure, untrustworthy character, and therefore liable to produce dangerous results. Pure chloral produces rest and relieves pain without giving rise to excitement, nausea, or gastric irritation; and its effects do not need to be enhanced, as in the case of opiates, by increasing doses, if its administration needs to be continued. Impure chloral, on the other hand, irritates the stomach, produces excitation, headache, sickness. To produce the best effects of chloral it should not be given on an empty stomach. It is not necessary that a full meal should have been taken, but it is desirable that some light nourishment or a biscuit or something of the sort should be eaten before the dose of chloral is administered.

I may add, finally, one word as to the clinical observation of the effects of chloral hydrate when it has been administered in excess, or when it has been used as a poison. Chloral hydrate poisons by paralyzing the heart, and its effects are observable in retardation of the pulse and respiration. Hence I have been led to urge the use of strychnine in combating these effects. The results of my experiments (*Transactions of the Academy of Medicine of Berlin*) have been confirmed by subsequent observers, but I believe that this antidotal use of strychnia to combat excessive or fatal doses of chloral may still be usefully brought to the notice of practitioners in general; for it is not so far or, I observe, so generally known as it might be. I have often been struck with the report of bounding pulse, severe headache, and nervous excitement in reported cases of an overdose of chloral; these are not the characteristic effects of chloral, but of impure and poisonous substances sold as chloral, and especially the various impure and unreliable solutions of chloral, which physicians and dispensers too readily employ.

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The Mode of Action of Narcotics.

The last quarterly number of the *Archiv für Exper. Pathol. und Pharmacop.* contains an article on this subject by Dr. BINZ. Funke long ago affirmed that brain-substance in a state of rest was alkaline, but acid after a period of activity. Durham regarded this acid condition as hindering the oxidation upon which the function of the brain depended. Heynsius, on the other hand, looked upon it as retarding the transudation of albumen into the brain-substance. Of more recent date is Preyer's theory, that sleep is due to a tiring of the brain through an accumulation in it of the products of tissue-waste, which seize upon the oxygen destined for the brain, and thus renders it unable to perform its function. But relying on the changes produced by the action of morphia, chloral, ether, and chloroform on fresh pieces of living brain—coagulating and darkening the intercellular substance; and taking into consideration the properties possessed by quinine and other allied alkaloids, of entering into a kind of temporary combination with certain forms of protoplasm, and thereby diminishing its oxidizing power, Binz supposes that these bodies possess strong affinities for the gray substance of the brain, and therefore enter into combination with it, and that, through the resulting alterations in its tissue-changes, it is unfitted to perform its function of wakefulness. Chloroform and ether form less stable combinations, and are, accordingly, more fleeting in their action than morphia or chloral. His experiments further show that sleep is not necessarily preceded by diminished blood-supply, but that this follows rather as the consequence, than as the cause, of the narcosis. Like other resting organs, the brain in a state of sleep contains less blood than in the active condition.—*London Med. Record*, April 15, 1877.

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The Physiological Action of Salicylate of Soda.

The results of a series of investigations made by Dr. DANEWSKY show that the salicylate of soda exerts a very characteristic influence on the vascular system. In the first instance it augments the energy of the cardiac contractions, causing more powerful systolic movements and increase of the blood-pressure. In consequence of the action of the drug on the vagi the pulse frequency is sometimes greater, sometimes less than normal, and at a later period from the excito-motor cardiac nervous system becoming paralyzed the pulse is weak. The augmentation of the blood-pressure is due partly to the greater energy of the cardiac contractions, partly to the direct stimulation of the vasomotor centres. This is proved by the fact that the blood-pressure falls after division of the spinal cord in the cervical region; whilst it rises on the injection of salicylate into the carotid artery, which causes the brain to receive a certain quantity of the remedy before the heart. There is an increased frequency of the respiratory movements due to irritation of the pulmonary vagi, and not to direct participation of the respiratory centre in the medulla. It is only after very large doses have been administered that the respiratory centre is gradually or rapidly paralyzed and asphyxia is produced. In regard to the influence of the salt upon the temperature, which is of chief importance in a therapeutic point of view, it is very inconstant as well as inconsiderable both in healthy men and animals, but in the febrile state its action is powerful in both. The most probable explanation of its refrigerant powers he considers to be that in the febrile condition there is diminution of blood-pressure as a result of diminished cardiac and vasomotor activity, but when the salicylate of soda is given, it acts like quinine and digitalis in augmenting the blood-pressure and promotes the elimination of caloric.—*Practitioner*, May, 1877, from *Arbeiten aus der pharmakolog. Laborat. zu Moskau*, 1876, Band i. p. 198.

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Carbolated Camphor as a Surgical Dressing.

Dr. SOULEZ, of Romorantin, recommends this substance (*La Tribune Médicale*, Dec. 24). He prepares it by mixing 15 grains of carbolic acid (dissolved in an equal quantity of alcohol) with 37½ grains of powdered camphor. The product is an oleaginous pale-yellow liquid, with a feeble odour of camphor, and none of carbolic acid. It does not mix with water or glycerine, but mixes with olive and almond oils. The infusion of saponaria (1 part of the leaves of soapwort to 10 parts of water) emulsifies it, as does also the alcoholic tincture of Panama bark. When mixed with an equal part of the carbolated camphor, this tincture produces a mother emulsion, which, when weakened with water, is used to prepare the antiseptic wadding.

In dressing a wound, Dr. Soulez covers it first with a square of wadding, which is impregnated with a mixture of carbolated camphor and olive oil. This must be large enough to extend 2½ to 3 inches beyond the wound. This is then covered by six other layers of wadding, impregnated with the emulsion above mentioned. Each layer should be one inch wider than the one below it. A thin envelope of caoutchouc is then applied to prevent evaporation, and over this a layer of dry wadding, and the whole is then secured by a bandage. The author alleges that this dressing is very easy of application; all the materials can be prepared beforehand and kept in well-covered jars. Before applying it, the wound should always be washed with the emulsion of carbolated camphor. When applied to a stump, this dressing keeps it enveloped in a warm atmosphere saturated with vapour of water, which lessens the exciting effects of the oxygen of the air, and is protected by the numerous layers of soft wadding, which keep out all infecting germs. Dr. Soulez renews the dressing usually every six days, but sometimes leaves it on for ten days. So far he has never known the carbolated camphor to cause the least irritation of the skin or the wound. When the caoutchouc is removed, all the layers of wadding are found to be as moist as when first applied. He states that he has obtained the following advantages from the use of his dressing: 1. Lessening of the reaction after major operations; 2. Cessation or diminution of the pain; 3. Diminution of the suppuration.—*London Med. Record*, May 15, 1877.

On a New Remedy in Certain Forms of Skin-disease.

Dr. J. IVOR MURRAY, of Scarborough, gives (*British Med. Journal*, May 19, 1877) the following account of this new remedy:—

Nearly twenty years ago, when I went out as her Majesty's Colonial Surgeon to Hong Kong, I accidentally became aware of the existence of a remedy, known to the natives of the Malay Peninsula (for the cure of ringworm and some other forms of skin-disease), and which in their hands had proved most successful. After much trouble, I obtained some of the remedy in the form of an imperfect tincture, prepared by immersion and maceration of the root of a plant in the impure native spirit called arrack, and verified the wonderful power it exerted in the cure of various forms of tinea and some forms of eczema. The quantity of the remedy I obtained was at first very small, and I encountered great difficulty in getting it in any quantity, as the secret appeared to be kept in one family. After much trouble, however, I succeeded in increasing my supply, and got proof-spirit substituted for the arrack in its preparation. Subsequently, Messrs. Watson of the Hong Kong Dispensary negotiated with the natives to procure the remedy more freely; and, at my request, they have made arrangements to supply it, to any reasonable extent, through their London agent, Mr. Edwards, 38 Old Change, of whom it may now be obtained. It is known as the fluid extract of *Tong Pang Chong*.

I have submitted some of the root, through the kindness of my friend Dr. Hooker, to Mr. Jackson, the curator of the Kew Museum, who pronounces it to be "the produce of a Berberideous plant, and nearly identical with *Akebia quinata* (Decaisne)." Mr. John Thomson of King's College has extracted from the tincture a crystalline substance, which may prove to be allied to chrysophanic acid, and so account for its action.

I shall not pretend to enter into any explanation of the *rationale* of its curative power, but limit myself to the statement that I have used it in hundreds of cases, often with almost magical effect, and that it is now much employed in the East. It is necessary, however, to discriminate in selecting the cases in which to test its value. I have found it most useful in tinea circinata, where the circular margin of the disease is maintained; and perhaps it is even more successfully used in that very troublesome form of eczema (tinea?), which attacks the inside of the thighs and perineum, and the parts around the anus, which I have known to resist every description of treatment, internal and external, even in the most experienced hands; and I may add that, both in this and other forms of disease, I have found it succeed where the Goa powder had completely failed.

The method of application which I follow is to paint the part over by means of a camel's-hair pencil three times, allowing it to dry between each coat, and this is done every night at bedtime, until the part resumes its natural appearance.

I have employed it successfully in many cases in this country, both in my own practice and in consultation with other practitioners. The following is a characteristic case:—

A. B., a gentleman high in the Bengal Civil Service, arrived in England in July, 1874, then suffering from eczema marginatum in a slight degree. He placed himself immediately under the care of a distinguished specialist in London, and subsequently was treated by one of our most celebrated physicians, who ordered him to Harrogate. From the latter place he came here, having, from the first, steadily got worse; so that, when he put himself under my care on September 22d, or fourteen months after the first appearance of the disease, the patches were over eight inches in diameter, and the patient in agony, and almost sleepless. After trying other treatment unsuccessfully, on September 29 I applied the tong pang chong; and, on my visiting him next day, he declared the result to be almost miraculous. He was obliged to leave Scarborough on October 4, and shortly afterwards returned to India. The disease had entirely left him before he embarked.

In conclusion, if this new drug prove, in the hands of other practitioners, half as efficacious as it has done in my own, it will be a valuable addition to the means of treating one of the most troublesome classes of disease, and quite justify me in bringing it before the notice of the profession.

Chloral in Delirium Tremens.

A painful case, which has recently occurred, of a fatal result following the use of chloral medicinally employed, has raised the question whether chloral is a safe hypnotic, and to what extent it may with advantage be employed in the treatment of delirium tremens. Chloral seems at the present time to be as popular a remedy with our profession as with the public; and it is only when some sudden fatal result occurs that attention is called to the dangers which may attend its use; and we are too apt to imagine that some special want of precaution or excess in dose has been contributary to the fatal issue. But a truer view would be that the doses habitually prescribed and sanctioned by eminent authority, and employed in our large hospitals and asylums, are in many cases excessive, and that, especially in the case of delirium tremens and insanity, chloral is used to a needless and dangerous extent. Particularly is it so with delirium tremens and the various grades of alcoholic poisoning which are included under that term. Chloral in large or repeated doses is the routine, and oftentimes the exclusive, treatment to cut short delirium, to produce quiet and sleep, and to prevent those sudden outbursts of maniacal fury, which are sometimes so dangerous to the patient and his attendants.

It is time, then, that the profession should face the question—Is chloral a necessary, or even a safe, narcotic in cases of alcoholic poisoning, acute or chronic? Experience tends to the conviction that the practice of giving chloral in all such cases, and pushing it till it produces hypnotic effects, is one attended by immediate dangers, injurious in its ultimate effects upon the patient, and liable to great abuse on the part of nurses and attendants.

The cases of alcoholism in which narcotics are employed may, speaking roughly, be divided into three categories. A large number of cases occur in persons who, habitually moderate drinkers, or even abstemious, under the influence of excessive mental anxiety, or strain upon the nervous energies, or from some other cause, indulge in a prolonged drinking bout, which, with abstention from food, results in an acute attack of delirium tremens. In such cases the noisy violence of the delirium, the absence of sleep, and the general excitement of the whole system, seem to indicate the employment of sedatives, and, if combined with proper nutriment, quiet, and the withdrawal of stimulants, they no doubt conduce to a favourable issue. That such cases may be benefited by chloral we do not for a moment deny, but the doses need not be large, and should not be too often repeated; and we must add that the success of the treatment is proportioned to the amount of nourishment which can be given. Secondly, there are the cases of severe delirium tremens, usually the sequel of prolonged excess, rarely the first attack, and often arising only as the result of combined disease or injury and alcoholism, in which the constant restlessness, tremor, delirium, and jactitation, seem to threaten life by exhaustion, unless something be done to give temporary quiet and sleep to the patient; and in some cases, as, for example, of fracture liable to become compound, the local conditions render quiet essential. In these circumstances narcotics may be employed, but with great caution, for too often the quiet of sleep only passes into that of coma and death, and, as we shall see, chloral is not the safest drug in such cases. In a third class of cases the condition is one which is rather the result of continued excess than its direct effect. The nervous, restless, irritable condition, with or without slight tremor, with loss of appetite, constipation, and a craving for drink, and drink only, exists during the day, and when night comes, this condition passes into one of restlessness, slight delirium with hallucinations, or actual violence. It is true that this state is rarely seen apart from the direct effects of alcohol. In most cases the passion for drink is so strong, the craving for it so subtle and irresistible, that no subterfuge or artifice is left untried to get hold of drink, and, apart from physical impossibility, such people will and do drink. In these cases, especially at the present day, and amongst the better classes, there is often a combined indulgence in alcohol and chloral, and chloral-drinking, first used to drive away the troubled dreams and hallucinations at night, is prolonged and increased, in order to permit of a freer indulgence in alcohol. Now, it is in such cases as these that the use of chloral, whether as a sedative or a hypnotic, is most injurious. As a sedative, in small and frequently-repeated doses, it may dull the senses and quiet the craving, but it aggravates and prolongs the gastric catarrh, which is one of the exciting causes of the craving, and it does nothing to restore the healthy tone and appetite. As a hypnotic it is in some cases entirely ineffectual, even in large doses, and where it acts beneficially in this respect, the dose should never be maintained at a high level after one or two nights, but with proper repeated nourishment may be rapidly diminished or entirely withdrawn. But chloral has some special dangers in the case of drinkers which should not be lost sight of.

Alcohol, as is well known, produces, when continuously employed, fatty degeneration, of all the organs, and, amongst others, the heart; this more especially in some cases of spirit drinking. Chloral, too, like its ally chloroform, probably gives rise to a fatty degeneration of muscular tissue, and in particular of the heart, closely analogous both in its mode of production and character to that due to alcohol. Again, as is well seen in some cases of delirium tremens, alcohol causes a fluid condition of the blood, in which the normal state of the blood-corpuscles, and their relation to the liquor sanguinis, are altered; and as a physical condition evidencing this we see the defective coagulation of the blood and its tendency to transude too readily. We are not here entering into the intimate relations of these changes, and the effect they have on oxygenation and tissue nutrition; it is enough for our present purpose merely to indicate them. Chloral has a like effect, and similarly causes gradual destruction of red blood-corpuscles; so that in chronic chloral poisoning purpura is of frequent occurrence. In toxic doses chloral was formerly said to destroy, first the cerebral, then the muscular, thirdly the respiratory, and finally the cardiac functions. But this is certainly not true so far as concerns the usual result in suddenly fatal cases in the human subject, and modern research goes to disprove this view, and to show that cardiac paralysis, whether produced through the central nervous system or by a direct action on the heart, is the usual mode of death. And especially will this be the case when, from the effects of alcohol, or of continued chloral drinking, the cardiac muscle is already considerably degenerated, whilst at the same time the condition of the blood is such as to supply an imperfect stimulus to its contraction, and the impaired reaction between the blood and pulmonic capillaries affords an additional impediment to the circulation. In such cases sudden cardiac paralysis or asystole may put an end to life before any cerebral symptoms or retarded respiration have given the warning note of danger. Nor can any amount of negative evidence, derived from the absence of marked physical signs of organic disease, be sufficient to counterbalance the clear and decisive results of pathological investigation, which show how grave a degeneration may coexist with apparent health. And, be it remarked, such fatal results do not of necessity occur only after a large dose. In healthy subjects death has occurred in this manner from so small a dose as thirty grains; and there is abundant evidence that the toxic effects of chloral are cumulative in a higher degree than the hypnotic, and that this does not depend solely upon accumulation of the poison itself in the blood.—*Lancet*, May 19, 1877.